NSW GOVERNMENT | WorkCover

POSITION PAPER

January 2014

Supplying, installing and using semi-automatic quick hitches on excavators or backhoes

This paper is designed to provide information to people who supply, install or use semi-automatic quick hitches on excavators and backhoes.

Supplying or installing semi-automatic quick hitches will be phased out in NSW by 30 April 2014.

Supplying or installing semi-automatic hitches refers to:

- supplying used or unused semi-automatic hitches
- supplying new host machines with used or unused semi-automatic hitches, fitted or otherwise
- installing used or unused semi-automatic hitches on a different host machine.

Semi-automatic hitches fitted on host machines before 30 April 2014 can continue to be used, however:

- duty holders importing or bringing into NSW machines with semi-automatic hitches must have very clear evidence that the hitch was installed on the host machine before 30 April 2014
- suppliers of host machines with pre-existing semi-automatic hitches fitted before 30 April 2014 must provide written information to buyers outlining the safety issues raised in this position paper, as required by clause 199 of *Work Health and Safety Regulation 2011* (WHS Regulation)
- persons with management or control of machines that continue to use semi-automatic hitches must put in place measures to ensure the hitches are used only after engaging the safety system in accordance with the manufacturers' recommendations.

WorkCover NSW will commence necessary action from 2014 to secure compliance with this requirement. In 2014 WorkCover will also be engaging with industry regarding the use of other types of quick hitch (see table 1 and table 2).

Table 1

Type of hitch	Typical usage	WorkCover position
Half-hitch	Generally used on excavators up to 3 tonnes	Allowed to supply
Mechanical-hitch	These are used mostly on backhoes and excavators up to 5.0 tonnes	Allowed to supply. Improvements to the safety system to be discussed with stakeholders in 2014
Semi-automatic	Used to be very popular and generally used on excavators over 8 tonnes	Allowed to supply until 30 April 2014
Automatic – detach only Prevents attachments falling off but does not prevent swinging in the event the primary system fails or loses its retention force	Generally used in larger machines. This type is also available for machines as small as 2.5 tonnes	Allowed to supply. Implementing control measures to prevent swinging attachments will be discussed with stakeholders in 2014
Automatic – detach and swing Prevents falling off and swinging in the event the primary system fails	Generally used in machines over 3 tonnes	Allowed to supply

Table 2

Type of hitch	Requirement	WorkCover position
All types	Evidence that the quick-hitch is compatible with the attachments is available	Immediate
	Evidence that the quick-hitch is compatible with the host machine is available for inspection	Immediate
	Measures in place to ensure hitches are used only after engaging the safety device	Immediate

Further information

Background

In the first three months of 2012, two people died due to semi-automatic quick hitch related incidents. These fatalities were a result of attachments detaching from the hitch without warning and striking persons in the vicinity of the excavator.

A quick hitch is a device that is fitted to an excavator arm or a backhoe arm for the purpose of rapidly mounting/dismounting attachments. They are also known as 'quick couplers'. Different types of quick hitches are described in table 3, however, this paper is concerned with the semi-automatic type (ie those that use power to engage the primary retaining system but still have a manually engaged safety device).

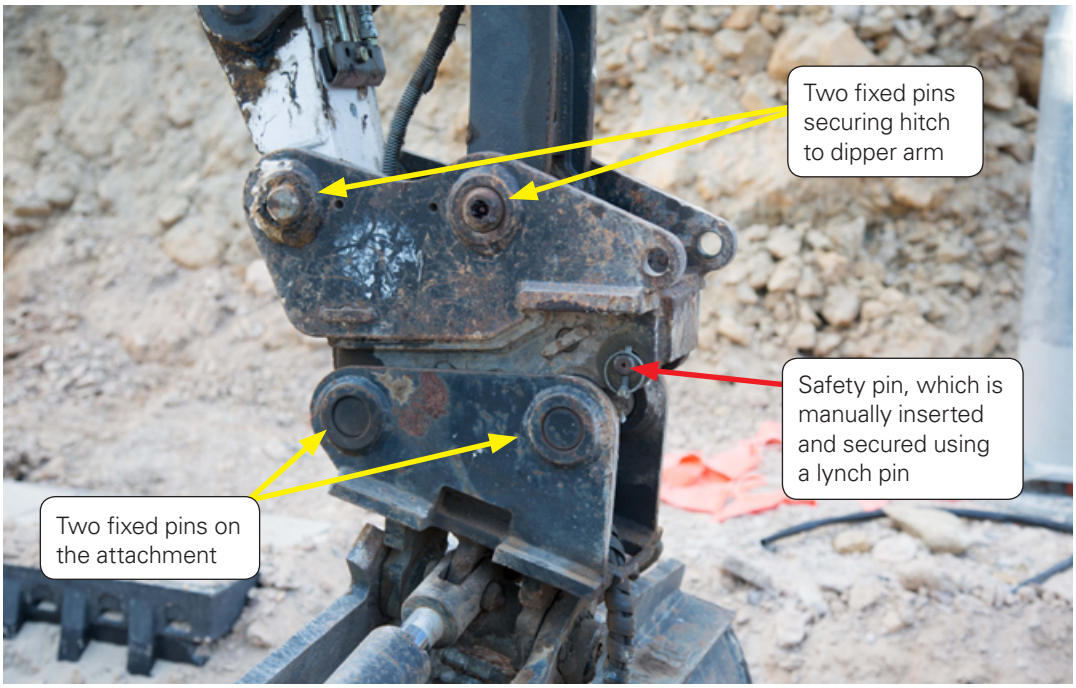

Photo 1: shows a semi-automatic hitch

Risks and safety issues

Verification activities undertaken by WorkCover in the second and third quarter of 2012 revealed that approximately 50 per cent of machines fitted with semi-automatic quick hitches were being used without the safety device being engaged.

Persons with management or control of hitches are required to control risks arising from the use of machines fitted with these hitches by implementing a safe system of work. This includes ensuring all safety devices are engaged prior to use.

Other measures to prevent unintended detachment from quick hitches include:

- ensuring attachments are compatible with the hitch
- ensuring hitches are compatible with the host machine
- ensuring the hydraulic circuit provides adequate pressure to retain the attachment
- verifying correct engagement of the primary retention system
- verifying correct engagement of the safety device

- preventing unintended activation of controls used to disengage the hitch
- performing appropriate inspection and maintenance of the hydraulic system, hitch and attachment, including checking for excessive wear on the corresponding parts.

Hierarchy of controls as applied to quick hitches

An administrative control measure is any measure that relies on human behaviour.

During demolition and civil construction work it is not uncommon to change the attachment on an excavator or backhoe multiple times per day. When using a semi-automatic quick hitch the safety system (usually a safety pin) must first be removed each time the attachment is changed. It must then be re-inserted after the new attachment has been engaged.

This potentially requires a machine operator to get off their machine and walk up to the hitch twice; firstly to disengage the safety pin on the attachment being removed, and then again to engage the safety pin on the newly connected attachment.

Engaging the safety device (ie the safety pin) on a semi-automatic quick hitch is an administrative control because it depends on human action. Findings from verification activities suggest that having to get in and out of their machines has meant many operators are simply not engaging the safety system when using semi-automatic hitches.

Work health and safety legislation only allows use of administrative controls if higher order control measures such as engineering controls are not reasonably practicable. Work health and safety legislation therefore precludes the supply of semi-automatic hitches, as designs that use higher order controls are available and are reasonably practicable.

For hierarchy of control requirements, refer to clause 36 of the WHS Regulation. For the definition of reasonably practicable, refer section 18 of the *Work Health and Safety Act 2011* (WHS Act).

Further information can also be obtained within the Safe Work Australia *Interpretive Guideline – Model Work Health and Safety Act: The meaning of 'reasonably practicable'*. The model code of practice *Managing Risks of Plant in the Workplace*, also provides guidance on these concepts, refer section 2.3, Controlling of risks. These documents can be accessed at safeworkaustralia.gov.au

Photo 2: Shows a worker locating the safety pin for the semi-automatic quick hitch This is an administrative measure, as is depends entirely on the action of the worker.

Photo 3: Another type of safety pin, in place and secured by a lynch pin to prevent it coming loose.

Photo 4: Shows the safety pin and lynch pin from photo 3.

Note: Half hitches and mechanical hitches also require the machine operator to get off their machines and walk up to the hitch, to engage both the retaining system and the safety system. However, unlike semi-automatic hitches there is no incentive for not engaging the safety system, as it is not possible to use the attachment unless someone has approached the hitch (and engaged the primary retention system).

Types of quick hitches

In order to identify different types of hitches described in this paper, the key characteristics of hitches are provided in table 3 over the page. These descriptions are examples of typical hitches used in the workplace; there may be other types of hitches that use different design concepts.

Quick hitches should have two mechanisms to engage the attachment; a primary retaining system and a backup safety system. In the event the primary retaining system fails, working forces should not act on any component of the hitch in a direction that could cause the safety device to disengage. Where a hitch can be engaged from the driver's cabin, it should be possible to verify correct engagement of the retaining system and the safety device from this position.

Hitches where it is not possible to verify the engagement of the safety device from the cabin are considered semi-automatic hitches.

Table 3: Typical functional characteristics of hitches

Terminology used in Australia and Australian standards	Primary retention system*	Safety system*	Verification of correct engagement of the primary retention system	Verification of correct engagement of the safety device
Terminology used in the draft ISO standard	Engagement system	Locking system	Verification of the engagement system	Verification of the engagement of the locking system
Half hitch	The second attachment pin is inserted through the holes in the attachment and the hitch frame.	Means of securing the second pin from disengaging – usually using a lynch pin.	Visual verification. Shaking, bumping or forcing the attachment against a hard surface using hydraulics.	Visual verification that the securing mechanism to prevent the removable pin from disengaging off has been engaged properly (eg pin cannot slip out of position as the lynch pin has been engaged).
Mechanical hitch	Mechanical – often using an over centre lever or by turning a screw thread fitted on the hitch.	Mechanical positive device is manually fitted on the hitch – usually a pin.	Visual verification. Shaking, bumping or forcing the attachment against a hard surface using hydraulics.	Visual verification to ensure that the mechanical safety device is secured in position (eg pin cannot slip out of position as the lynch pin has been engaged).
Semi-automatic	The retention system is engaged using hydraulic power, activated from the cabin of the machine.	Additional mechanical positive device is manually inserted on the hitch – usually a pin.	Visual verification. Shaking, bumping or forcing the attachment against a hard surface using hydraulics.	Visual verification to ensure mechanical safety device is secured in position (eg pin cannot slip out of its position as the lynch pin has been engaged).
Automatic	The retention system is engaged using hydraulic power, activated from the cabin of the machine.	A mechanical and positive device is engaged automatically as part of the attachment engagement process.	Visual verification from the cabin. Shaking, bumping or forcing the attachment against a hard surface using hydraulics.	Visually from the cabin or using a sensing system that provides a signal to the cabin.

*These columns do not include verification of the engagement of the safety device.

Glossary of terms

Retaining system is the primary retention system that locates the pins of the attachment in the corresponding location on the quick-hitch (or the host machine) to retain the attachment.

Safety system consists of a mechanical-positive device that prevents the disengagement of the attachment if the primary system fails. Some safety systems not only prevent disengagement of the attachment but also prevent swinging about one pin of the attachment if the primary retention system fails.

Working force is the force acting on the attachment or the components of the hitch when using attachments as intended, or during foreseeable misuse.

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